WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau



| INTERNATIONAL APPLICATION PUBLISH | HED U | UNDER THE PATENT COOPERATION TREATY (PCT) |
|--|----------------------------|--|
| (51) International Patent Classification ⁶ : A61K 39/00, C12Q 1/68, G01N 33/68 | A1 | (11) International Publication Number: WO 99/64064 (43) International Publication Date: 16 December 1999 (16.12.99) |
| (21) International Application Number: PCT/CA (22) International Filing Date: 13 May 1999 (| | 1600, 1981 McGill College Avenue, Montreal, Quebec H3A |
| (30) Priority Data: (09/090,567 8 June 1998 (08.06.98) | l | (81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KP, KZ, LC, LK, LP, LS, LT, LH, LV, MD, MG, ME, KP, KZ, LC, LK, LP, LS, LT, LH, LV, MD, MG, ME, KP, KZ, LC, LK, LP, LS, LT, LH, LV, MD, MG, ME, KP, KZ, LC, LK, LP, LS, LT, LH, LV, MD, MG, ME, ME, MS, MS, MS, MS, MS, MS, MS, MS, MS, MS |
| (63) Related by Continuation (CON) or Continuation-ir (CIP) to Earlier Application US 09/090.5 Filed on 8 June 1998 (6 | 567 (CI 08.06.9 | ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TI, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent |
| (71) Applicant (for all designated States except US): 1M INC. [CA/CA]; 1224 Stanley Street, Suite 313, 1 | | ON (BF. BJ. CF. CG. Cl. CM, GA, GN, GW, ML, MR, NE, |

(72) Inventors; and

Québec H3B 2S7 (CA).

(75) Inventors/Applicants (for US only): SULLIVAN, Robert [CA/CA]; 3261 Chemin St-Louis, Ste-Foy, Québec G1W ISI (CA). BERUBE, Bruno [CA/CA]; 76 du Buisson, Loretteville, Québec G2A 1M7 (CA). LEGARE, Christine [CA/CA]; 294 Paquet, St-Rédempteur, Québec G6K 1M3 (CA). GAUDREAULT, Christian [CA/CA]; Appartement 7, 710 Horizon, Ste-Foy, Québec G1V 2X7 (CA).

Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: ACROSOMAL SPERM PROTEIN AND USES THEREOF

(57) Abstract

The present invention relates to an acrosomal sperm protein for use in immunocontraception of male and female subjects and as a marker for fertility. The present invention provides a method of immunocontraception of a male or female subject, which comprises administering an antigenic fragment of a P34 protein showing a high specificity for the P34 to the subject to elicit an immunocontraception response by the subject. An immune response against the peptide occurs without side effects. Probes and diagnosis kits for male or female infertility are also provided.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | , | | | 1 | · Landens Lands | | a applications and the |
|---------------|--------------------------|-----|---------------------|----|-----------------------|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | Fl | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| ΑU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | ТJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav | TM | Turkmenistan |
| \mathbf{BF} | Burkina Faso | GR | Greece | | Republic of Macedonia | TR | Turkey |
| BG | Bulgaria | HU | Hungary | ML | Mali | TT | Trinidad and Tobago |
| ВJ | Benin | ΙE | Ireland | MN | Mongolia | UA | Ukraine |
| BR | Brazil | II. | Israel | MR | Mauritania | UG | Uganda |
| BY | Belarus | IS | Iceland | MW | Malawi | US | United States of America |
| CA | Canada | IT | Italy | MX | Mexico | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NE | Niger | VN | Viet Nam |
| CG | Congo | KE | Кепуа | NL | Netherlands | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NO | Norway | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's | NZ | New Zealand | | |
| CM | Cameroon | | Republic of Korea | PL | Poland | | |
| CN | China | KR | Republic of Korea | PT | Portugal | | |
| CU | Cuba | KZ | Kazakstan | RO | Romania | | |
| CZ | Czech Republic | LC | Saint Lucia | RU | Russian Federation | | |
| DE | Germany | Li | Liechtenstein | SD | Sudan | | |
| DK | Denmark | LK | Sri Lanka | SE | Sweden | | |
| EE | Estonia | LR | Liberia | SG | Singapore | | |
| | | | | | · · | | |

Interr nal Application No PCT/CA 99/00437

A. CLASSIFICATION OF SUBJECT MATTER IPC 6 A61K39/00 C12Q1/68

G01N33/68

According to International Patent Classification (IPC) or to both national classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) IPC $_6$ A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

| C. DOCUM | ENTS CONSIDERED TO BE RELEVANT | |
|----------|---|-----------------------|
| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Х | WO 97 40386 A (IMMUCON INC) 30 October 1997 (1997-10-30) the whole document | 5-8 |
| Y | BOUE F ET AL: "HUMAN SPERM-ZONA PELLUCIDA INTERACTION IS INHIBITED BY AN ANTISERUM AGAINST A HAMSTER SPERM PROTEIN" BIOLOGY OF REPRODUCTION, US, ORLANDO, FL, vol. 51, no. 4, page 577-587 XP002038410 ISSN: 0006-3363 abstract | 1,3 |

| Further documents are listed in the continuation of box C. | Patent family members are listed in annex. | | |
|--|--|--|--|
| "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention. "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone. "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. | | |
| later than the priority date claimed | "&" document member of the same patent family | | |
| Date of the actual completion of the international search 15 November 1999 | Date of mailing of the international search report $29/11/1999$ | | |
| Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentiaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx 31 651 epo ni, Fax: (+31-70) 340-3016 | Authorized officer Fernandez y Branas,F | | |





Interi nal Application No

PCT/CA 99/00437

| | | PCT/CA 99/00437 |
|------------|---|----------------------|
| C.(Continu | ation) DOCUMENTS CONSIDERED TO BE RELEVANT | |
| Category | Citation of decument, with indication, where appropriate of the relevant passages | Relevant to claim No |
| Y | BERUBE B. ET AL: "Inhibition of in vivo fertilization by active immunization of male hamsters against a 26-kDa sperm glycoprotein" BIOLOGY OF REPRODUCTION, vol. 51, 1994, pages 1255-1263, XP002122660 abstract | 1,3 |
| A | BOUE F ET AL: "SURFACE LOCALIZATION OF P34H, AN EPIDIDYMAL PROTEIN, DURING MATURATION, CAPACITATION, AND ACROSOME REACTION OF HUMAN SPERMATOZOA" BIOLOGY OF REPRODUCTION, US, ORLANDO, FL, vol. 54, no. 5, page 1009-1017 XP002038412 ISSN: 0006-3363 page 1011, "sperm protein extraction" | 1-8 |
| A | US 5 753 231 A (HERR JOHN C ET AL) 19 May 1998 (1998-05-19) | 1-3 |
| A | US 5 756 299 A (GOLI SURYA K ET AL) 26 May 1998 (1998-05-26) | |
| | | |

INTERNATIONAL SEARCH REPORT

i lational application No.

PCT/CA 99/00437

| Box I | Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet) |
|-----------|--|
| This Inte | ernational Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons: |
| 1. X | Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely: Remark: Although claims 1 and 2 are directed to a method of treatment of the human body, the search has been carried out and based on the alleged effects of the compound/composition. |
| 2. | Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically: |
| 3. | Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a). |
| Box il | Observations where unity of invention is lacking (Continuation of item 2 of first sheet) |
| This Inte | ernational Searching Authority found multiple inventions in this international application, as follows: |
| 1. | As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims. |
| 2. | As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee. |
| 3. | As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.: |
| 4 | No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: |
| Remari | The additional search fees were accompanied by the applicant's protest. No protest accompanied the payment of additional search fees. |
| | The second secon |

Interr hal Application No PCT/CA 99/00437

autormation on patent family members

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date | |
|--|------------------|---|--|--|
| WO 9740386 A | 30-10-1997 | US 5723305 A AU 2284997 A CA 2251964 A EP 0906575 A | 03-03-1998 12-11-1997 30-10-1997 07-04-1999 | |
| US 5753231 A | 19-05-1998 | US 5602005 A US 5436157 A US 5605803 A AT 176156 T AU 649609 B AU 5186290 A DE 69032922 D DE 69032922 T EP 0461177 A ES 2130121 T JP 4505008 T WO 9009802 A | 11-02-1997 25-07-1995 25-02-1997 15-02-1999 02-06-1994 26-09-1990 11-03-1999 30-09-1999 18-12-1991 01-07-1999 03-09-1992 07-09-1995 | |
| US 5756299 A | 26-05-1998 | AU 5594098 A WO 9826076 A | 03-07-1998 18-06-1998 | |